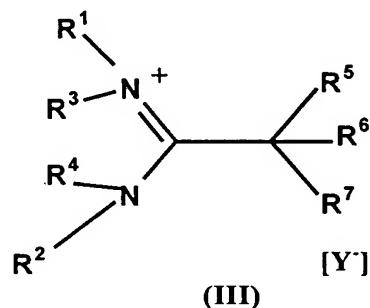
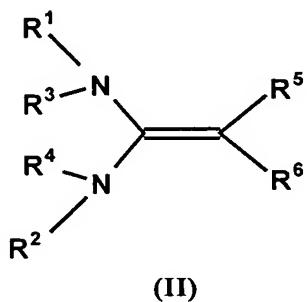


**What is claimed is:**

1. A process for preparing complexes of metals of groups 6 to 10 of the Periodic Table of the Elements by reacting a compound of a metal of groups 6 to 10 of the Periodic Table of the Elements with compounds of the formula II and/or III

5



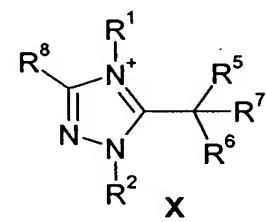
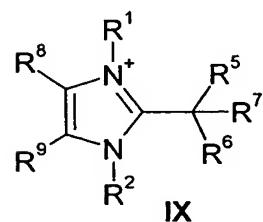
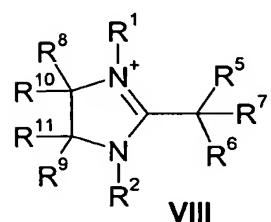
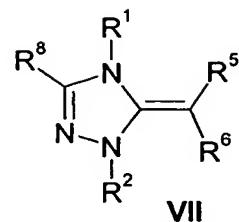
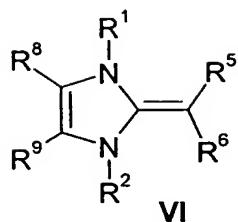
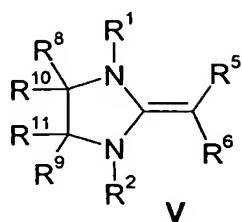
10 where  $R^1, R^2, R^3, R^4$  are the same or different and are each linear, branched, substituted or unsubstituted, cyclic or alicyclic alkyl groups having from 1 to 24 carbon atoms; substituted or unsubstituted, mono- or polycyclic aryl groups having from 6 to 24 carbon atoms; mono- or polycyclic, substituted or unsubstituted heterocycles having from 2 to 24 carbon atoms; a heteroatom from the group of N, O, S, and  $R^3, R^4$  may have a covalent bond

15  $R^5, R^6, R^7$  may be the same or different and may each be H, linear, branched, substituted or unsubstituted, cyclic or alicyclic alkyl groups having from 1 to 24 carbon atoms; substituted or unsubstituted, mono- or polycyclic aryl groups having from 6 to 24 carbon atoms, with the proviso that the  $R^7$  substituent is not H.

20

2. The process as claimed in claim 1,  
characterized in that  
the compounds of the formulae II or III used are compounds of the general formulae V to X

25



where

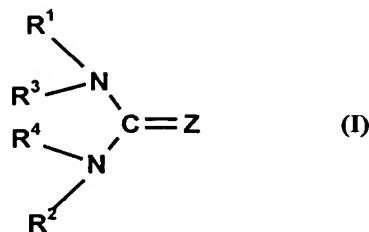
$R^1, R^2, R^5, R^6, R^7$  are each as defined above and

5  $R^8, R^9, R^{10}, R^{11}$  are the same or different and are each H or have one of the definitions of  $R^1$ .

3. The process as claimed in claim 1 or 2,

characterized in that

10 complexes of the general formula I



are prepared where [Z] is a metal complex fragment of the general formula

15



and

M is: metals of groups 6 to 10 of the Periodic Table of the Elements

20 L is: one or more identical or different mono- or polydentate, charged or uncharged

## ligands

A is: a singly charged anion or the chemical equivalent of a multiply charged anion,

b is: an integer of from 1 to 3

a is: an integer of from 0 to  $5 \times b$

5 n is: an integer from 0 to 6

and  $R^1, R^2, R^3, R^4$  are each defined as specified.

4. The process as claimed in claim 3,

characterized in that

10 L in the general formula (XI) is hydrogen, the hydrogen ion, halogens, halogen ions, pseudohalides, carboxylate ions, sulfonate ions, amide radicals, alkyl groups, alkylaryl groups, aryl groups, heteroaryl groups, alkenyl groups, alkoxide radicals, nitriles, isonitriles, mono- or diolefins, alkynes,  $\pi$ -aromatic radicals, cyclopentadienyl, indenyl, phosphines, phosphites, phosphinites, phosphonites, phosphorus aromatics, acetylacetone, carbon monoxide, nitrogen monoxide or carbene ligands, where the alkyl groups contain from 1 to 24, the alkenyl and heteroaryl groups from 2 to 24, and the aryl and alkylaryl groups from 5 to 24, carbon atoms, and may each be substituted or unsubstituted.

20 5. The process as claimed in claim 3,

characterized in that

A in the general formula (XI) is halide, pseudohalide, tetraphenylborate, tetrafluoroborate, tetrachloroborate, hexafluorophosphate, hexafluoroantimonate, tetracarbonylcobaltate, hexafluoroferrate, tetrachloroferrate, tetrachloroaluminate, triflate, 25 bistrifluorosulfonylamide, heptachlorodialuminate, tetrachloropalladate, sulfate, hydrogensulfate, nitrate, nitrite, phosphate, hydrogenphosphate, dihydrogenphosphate, hydroxide, carbonate, hydrogencarbonate, salts of aromatic or aliphatic carboxylic acids, salts of aromatic or aliphatic sulfonic acids or phenoxides.

30 6. The process as claimed in claim 1 to 5,

characterized in that

the metal of groups 6 to 10 of the Periodic Table which is used is Ru, Rh, Ni, Pd or Pt.

7. The process as claimed in one of claims 1 to 6,

characterized in that

the metal complexes (I) are prepared from the compounds II to X and a metal of groups 6 to 10 of the Periodic Table in situ as catalysts or catalyst precursors in hydroformylations, hydrogenations, aryl aminations, hydrosilylations, Heck reactions, Suzuki couplings, Kumada couplings, Stille couplings, Miyaura couplings, Sonogashira couplings, olefin metatheses, cyclopropanations, reduction of haloarenes, polymerizations or telomerization reactions.

10

8. The process as claimed in one of claims 1 to 7,

characterized in that

one or more of the compounds II to X is used in a ratio of from 1 to 100 mol to the metal of groups 6 to 10 of the Periodic Table.

15

9. The use of the metal complexes (I) as catalysts in hydroformylations, hydrogenations, aryl aminations, hydrosilylations, Heck reactions, Suzuki couplings, Kumada couplings, Stille couplings, Miyaura couplings, Sonogashira couplings, olefin metatheses, cyclopropanations, reduction of haloarenes, polymerizations or telomerization reactions.

20

10. The use of the compounds II and/or III as ligand precursors in hydroformylations, hydrogenations, aryl aminations, hydrosilylations, Heck reactions, Suzuki couplings, Kumada couplings, Stille couplings, Miyaura couplings, Sonogashira couplings, olefin metatheses, cyclopropanations, reduction of haloarenes, polymerizations or telomerization reactions.

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